REMARKS/ARGUMENTS

Reconsideration of the application as amended is respectfully requested.

Status of the Claims

Claims 1-3 and 5-7 are pending in the application, with claim 1 and 6 being the only independent claims. Claims 1 and 6 have been amended.

Overview of the Office Action

Claims 1 and 5 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,157,470 (*Matsuzaki*) in view of U.S. Patent No. 6,686,985 (*Tanaka*), as evidenced by U.S. Patent No. 6,326,642 (*Yamazaki*).

Claims 2 and 3 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Matsuzaki* in view of *Tanaka*, as evidenced by *Yamazaki*, and further in view of U.S. Patent No. 6,277,507 (*Anzaki*).

Claims 6 and 7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Matsuzaki* in view of *Tanaka* and *Anzaki*, as evidenced by *Yamazaki*.

Summary of Subject Matter Disclosed in the Specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The present specification discloses a semi-transmitting mirror-possessing substrate assembly 1 that has both high transmissivity and high reflectivity. *See* paragraph [0001] of the published specification.

The semi-transmitting mirror-possessing substrate assembly 1 comprises a glass substrate 2, a foundation film 3 formed directly on the glass substrate 2, a semi-transmitting reflective film 4 formed directly on the foundation film 3, and a liquid crystal layer 12 formed on the semi-transmitting reflective film 4 and interposed between a pair of transparent conductive films 9, 13. *See* Figs. 1 and 2. Thus, the semi-transmitting reflective film 4 is disposed between the foundation film 3 and the lower transparent conductive film 9 for the liquid crystal layer 12. *See* Fig. 2.

The foundation film 3, the semi-transmitting reflective film 4 and a protective film 5 constitute a semi-transmitting mirror 6. *See* Fig. 1; paragraph [0025] of the published specification.

The foundation film 3 prevents diffusion of an alkali leaching out from the inside of the glass substrate 2 and improves adhesion between the glass substrate 2 and the semi-transmitting reflective film 4. *See* paragraph [0028] of the published specification.

The thickness of the foundation film 3 is in a range of greater than 0 to 8 nm. This particular thickness range improves the crystal structure of the Al metal in the semi-transmitting reflective film 4 formed on the foundation film 3 so that an increase in the amount of optical absorption of the Al metal can be prevented. As a result, both the optical transmission performance and the reflection performance of the semi-transmitting reflective film 4 or the semi-transmitting mirror 6 can be improved. *See* paragraph [0028] of the published specification.

It has been found that in the case that the transmissivity is unchanged, if the thickness of the foundation film 3 exceeds 8 nm, the reflectivity suddenly drops. *See* paragraph [0041] of the published specification.

Furthermore, the chemical composition ratio x of oxygen (O) to silicon (Si) in the silicon oxide (SiO_x) used as the foundation film 3 is in a range of 1.5 to 2.0. This particular chemical

composition ratio also improves the crystal structure of the Al metal in the semi-transmitting reflective film 4 formed on the foundation film 3 so that an increase in the amount of optical absorption of the Al metal can be prevented. As a result, both the optical transmission performance and the reflection performance of the semi-transmitting reflective film 4 or the semi-transmitting mirror 6 can be improved. *See* paragraph [0029] of the published specification.

It has been found that in the case that the transmissivity is unchanged, if the chemical composition ratio x of oxygen (O) to silicon (Si) in the silicon oxide (SiO_x) used as the foundation film 3 is less than 1.5, the reflectivity suddenly drops. *See* paragraph [0047] of the published specification.

Allowability of the Claims

Independent Claim 1

Amended independent claim 1 recites the following:

> "a semi-transmitting reflective film directly formed on said foundation film; and
>
> a liquid crystal layer formed on said semi-transmitting reflective film and interposed between a pair of transparent conductive films,
>
> wherein said semi-transmitting reflective film is made of at least one selected from the group consisting of Al and Al alloys" (emphasis added).

Thus, in amended claim 1, the semi-transmitting reflective film is different from any of the transparent conductive films for the liquid crystal layer.

In addition, the semi-transmitting reflective film, which is directly formed on the foundation film and made of at least one selected from the group consisting of Al and Al alloys, is disposed between the foundation film and one of the pair of transparent conductive films, i.e., the pair of transparent conductive films between which is disposed the liquid crystal layer,

(referred to below for ease of discussion as a lower transparent conductive film for a liquid crystal layer).

Applicants respectfully submit that amended claim 1 is patentable over *Matsuzaki* in view of *Tanaka*, as evidenced by *Yamazaki*, because the combination of *Matsuzaki*, *Tanaka* and/or *Yamazaki* fails to teach or suggest a semi-transmitting reflective film which is disposed between the foundation film and the lower transparent conductive film for a liquid crystal layer, directly formed on the foundation film, and made of at least one selected from the group consisting of Al and Al alloys, as now recited in amended claim 1

Matsuzaki relates to a thin film transistor and an image display device using the thin film transistor (*see* col. 1, lines 11-14 of *Matsuzaki*). The thin film transistor of *Matsuzaki* includes an insulating substrate 1 such as a glass plate, a first electrode 2 acting as a gate electrode, a gate insulating film 3, a thin film pattern 4 mainly composed of silicon and acting as a semiconductor film, and a thin film 10 containing silicon oxide. On the thin film 10, a second electrode 5 acting as a drain electrode and a third electrode 6 acting as a source electrode are formed. *See* Figs. 2A and 2B and col. 6, lines 26-37 of *Matsuzaki*.

The image display device of *Matsuzaki* uses an active matrix circuit board 70 which comprises the above-discussed thin film transistors. The image display device includes a display pixel electrode 7 which is composed of a transparent conductive film and directly formed on the gate insulating film 3, and a liquid crystal 25 which is disposed above the display pixel electrode 7 and sandwiched by a pair of orientation films 24. A counter electrode 23 composed of a transparent conductive film is disposed directly on the upper orientation film 24 for the liquid crystal 25. *See* Figs. 8A and 8B and col. 10, lines 2-20 of *Matsuzaki*. Therefore, in *Matsuzaki*, the liquid crystal 25 is disposed between the display pixel electrode 7 and the counter electrode 23.

On page 3 of the Office Action, the Examiner states:

"Matsuzaki teaches that the pixel electrode film [7] is transmitting (transparent, column 10, lines 15-16), but fails to teach that it is semi-transmitting and reflective, let alone that it is made of aluminum (Al)."

Thus, The Examiner acknowledges that the display pixel electrode 7 of *Matsuzaki* is not semi-transmitting and reflective, and is not made of at least one selected from the group consisting of Al and Al alloys. To bridge these "gaps" between claim 1 and *Matsuzaki*, the Examiner refers to the pixel electrode 234 of *Tanaka*.

However, as explained in detail below, the combination of *Matsuzaki* and *Tanaka* still fails to teach or suggest a semi-transmitting reflective film which is disposed between a foundation film and a lower transparent conductive film for a liquid crystal layer, directly formed on the foundation film, and made of at least one selected from the group consisting of Al and Al alloys, as now recited in amended claim 1 of the present application.

The Examiner is interpreting the display pixel electrode 7 of *Matsuzaki* as a film directly formed on the gate insulating film 3. However, as discussed above, the display pixel electrode 7 and the counter electrode 23 of *Matsuzaki* constitute the lower and upper transparent conductive films for the liquid crystal 25. In other words, the display pixel electrode 7 is the lower transparent conductive film for the liquid crystal 25. As such, the display pixel electrode 7 of *Matsuzaki* does not qualify as a film which is disposed between the gate insulating film 3 and the lower conductive film for the liquid crystal 25.

Moreover, between the display pixel electrode 7 and the gate insulating film 3 of *Matsuzaki* there is no film which is semi-transmitting reflective, and made of at least one selected from the group consisting of Al and Al alloys.

Therefore, *Matsuzaki* fails to teach or suggest a semi-transmitting reflective film which is disposed between a foundation film and a lower transparent conductive film for a liquid crystal layer, directly formed on the foundation film, and made of at least one selected from the group consisting of Al and Al alloys, as now reflected in amended claim 1.

Tanaka does not supply what is missing from *Matsuzaki* in this regard.

Tanaka relates to a liquid crystal panel 100 which comprises a plurality of scanning lines 312 extending in the X direction, a plurality of data lines 212 extending in the Y direction, and pixels 116 formed at the intersections of the scanning lines 312 and the data lines 212. The pixels 116 include liquid crystal layers 118 and thin film diode (TFD) devices 220 connected in series. The liquid crystal layers 118 are connected to the respective scanning lines 312. The TFD devices 220 are connected to the respective data lines 212. *See* Fig. 1 and col. 5, lines 25-42 of *Tanaka*.

Elements of each TFD device 220 are shown in Figs. 3 and 4 of *Tanaka*. According to *Tanaka*, pixel electrodes 234 and the TFD devices 220 are formed on an insulator film 201 which is in turn formed directly on a device substrate 200. The pixel electrodes 234 are connected, through the TFD devices 220, to the data lines 212. In contrast, the scanning lines 312 are formed on an opposing substrate. *See* Figs. 3 and 4 and col. 5, lines 51-58 of *Tanaka*.

The liquid crystal layers 118 in Fig. 1 include the pixel electrodes 234. The scanning lines 312 operate as counter electrodes to the pixel electrodes 234. The liquid crystal layers are held between the two types of electrodes. See col. 5, lines 58-63 of *Tanaka*. As a result, the pixel electrodes 234 constitute the lower conductive film for the liquid crystal. As such, the pixel electrodes 234 of *Tanaka* do not qualify as a film which is different from the lower conductive film for the liquid crystal, and disposed between the insulator film 201 and the lower conductive film for the liquid crystal.

Moreover, between the pixel electrodes 234 and the insulator film 201 of *Tanaka* there is no film which is semi-transmitting reflective, directly formed on a foundation film, and made of at least one selected from the group consisting of Al and Al alloys.

Therefore, like *Matsuzaki*, *Tanaka* also fails to teach or suggest a semi-transmitting reflective film which is disposed between a foundation film and a lower transparent conductive

film for a liquid crystal layer, directly formed on the foundation film, and made of at least one selected from the group consisting of Al and Al alloys, as now recited in amended claim 1.

Like *Tanaka*, *Yamazaki* also does not supply what is missing from *Matsuzaki* in this regard. The Examiner cites *Yamazaki* for the sole purpose of illustrating that a foundation film can have a thickness of 5 nm.

In view of the foregoing, withdrawal of the §103(a) rejection of claim 1 is respectfully requested.

Independent Claim 6

Independent claim 6 has also been amended to recite a combination of features such that semi-transmitting reflective film is disposed between a foundation film and a lower transparent conductive film for a liquid crystal layer, wherein the semi-transmitting reflective film is directly formed on the foundation film, and is made of at least one selected from the group consisting of Al and Al alloys. As such, amended claim 6 is patentable for reasons discussed above in connection with amended claim 1.

Withdrawal of the §103(a) rejection of claim 6 is therefore respectfully requested.

Dependent Claims 2, 3, 5 and 7

Claims 2, 3 and 5 depend, either directly or indirectly, from claim 1, and, thus, each is allowable therewith. Likewise, claim 7 depends from claim 6 and, thus, is allowable therewith.

In addition, claims 2, 3, 5 and 7 include features which serve to even more clearly distinguish the claimed invention over the prior art of record.

Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited.

Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

Respectfully submitted,

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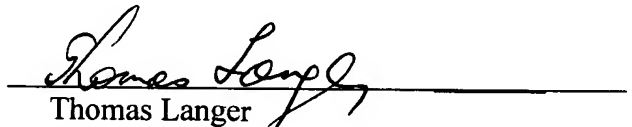
By 

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